Vraag 1 / *Question 1*

Voltooi die volgende tabel van De Morgan se reëls vir gekwantifiseerde en ongekwantifiseerde sinne.

Complete the following table of De Morgan's rules for quantified and unquantified sentences. [4 x 2 = 8]

(1.1)	≡	¬∃x P
¬∀x P	≡	(1.2)
(1.3)	≡	¬∃x ¬P
∃x P	≡	(1.4)

(1.1) ∀x ¬P	≡	¬∃x P
¬∀x P	≡	(1.2) ∃x ¬P
(1.3) ∀x P	≡	¬∃x ¬P
∃x P	≡	(1.4) ¬∀x ¬P

Vraag 2 / *Question 2*

Gee Eerste-orde Logika uitdrukkings vir die volgende familie verwantskappe:

Give First-Order Logic expressions for the following family relationships: [6 x 2 = 12]

2.1 ∀m,c Mother(c) = m ⇔ ?
2.2 ∀w,h Husband(h, w) ⇔ ?
2.3 ∀x Male(x) ⇔ ?
2.4 ∀p,c Parent(p, c) ⇔ ?
2.5 ∀g,c Grandparent(g, c) ⇔ ?
2.6 ∀x,y Sibling(x, y) ⇔ ?

2.1 ∀m,c Mother(c) = m ⇔ Female(m) ∧ Parent(m, c)
2.2 ∀w,h Husband(h, w) ⇔ Male(h) ∧ Spouse(h, w)
2.3 ∀x Male(x) ⇔ ¬Female(x)
2.4 ∀p,c Parent(p, c) ⇔ Child(c, p)
2.5 ∀g,c Grandparent(g, c) ⇔ ∃p Parent(g, p) ∧ Parent(p, c)
2.6 ∀x,y Sibling(x, y) ⇔ x ≠ y ∧ ∃p Parent(p, x) ∧ Parent(p, y)

Totaal [20] / *Total [20]*